

CALIFORNIA DIVISION OF MINES AND GEOLOGY

Fault Evaluation Report FER-70

February 8, 1978

1. Name of fault: San Andreas (Palmdale segment) and associated faults.
2. Location: Los Angeles County; Ritter Ridge and Palmdale 7.5' quadrangles (see figure 1).
3. Reason for evaluation: New geologic data (mainly Barrows, et al, 1976) indicate the need to revise the existing Special Studies Zones (CDMG, 1974).
4. References:

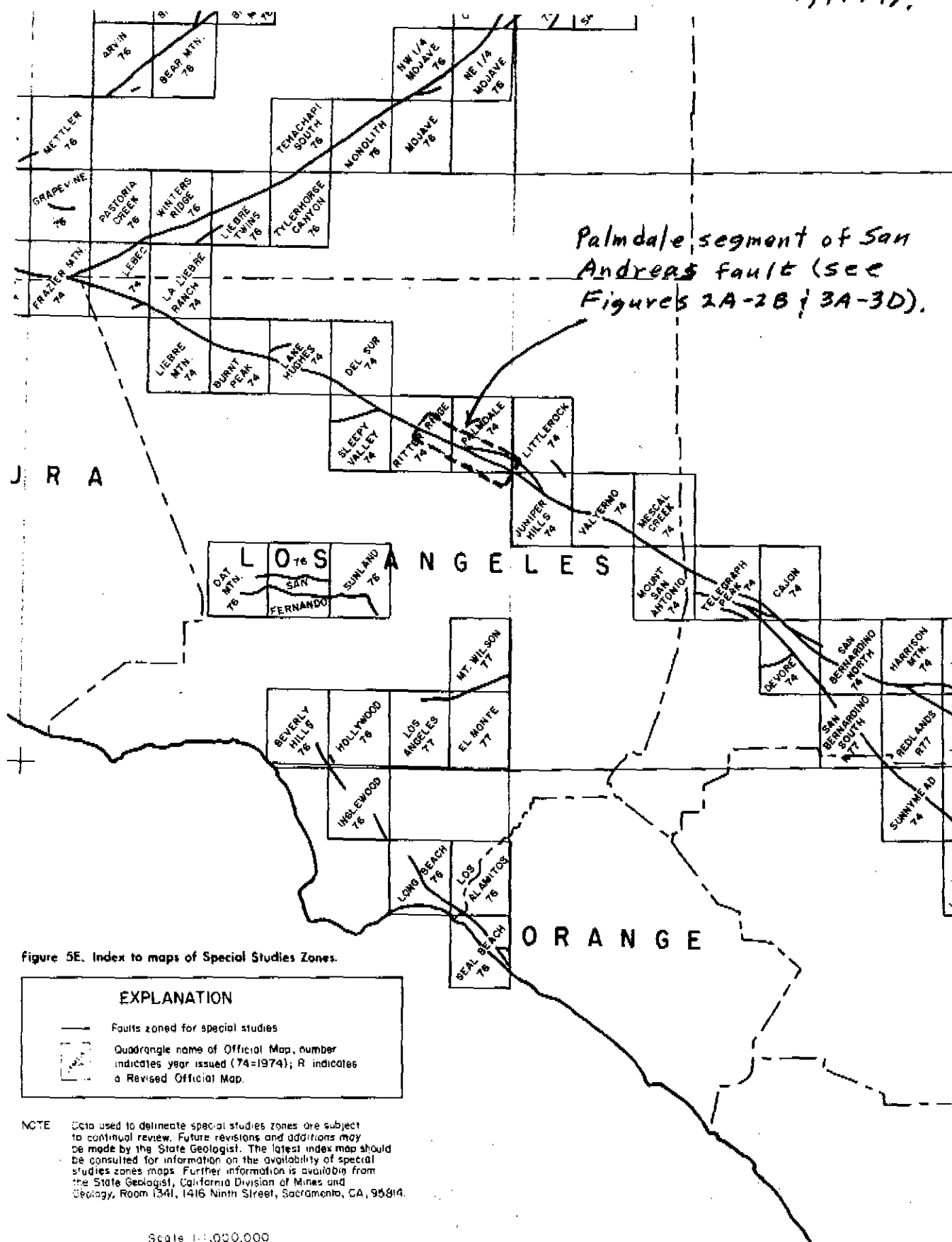
Barrows, A.G., Kahle, J.E. Kahle, and Beeby, D.J., 1976, Geology and fault activity of the Palmdale segment of the San Andreas fault zone, Los Angeles County, California: California Division of Mines and Geology, Open File Report OFR 76-6 LA, 4 geologic maps (scale 1:12,000).

California Division of Mines and Geology, 1974, Official Maps of Special Studies Zones, issued July 1, 1974, Ritter Ridge and Palmdale quadrangles (scale 1:24,000).

Hart, E.W., 1977, Fault hazard zones in California -- Alquist-Priolo Special Studies Zones Act of 1972 with index to Special Studies Zones Maps: California Division of Mines and Geology, Special Publication 42, 24 p.

Kahle, J.E., Smith, D.P., and Beeby, D.J., 1975, San Andreas fault project -- earthquake hazards of geologic mapping of the Palmdale segment, Los Angeles County, California: California Division of Mines and Geology, Annual Technical Report -- Fiscal Year 1974-75 (to U.S. Geological Survey), 4 p., 4 annotated preliminary fault maps (scale 1:12,000).

Figure 1. Location map showing Palmdale segment of San Andreas Fault and special studies Zones Maps (after Hart, 1977).



Noble, L.F., 1953, Geology of the Pearland quadrangle, California:

U.S. Geological Survey Geologic Quadrangle Map 24 (1:24,000 scale).

5. Summary of available data:

The Palmdale segment of the San Andreas fault and the nearby associated faults were zoned in 1974 under the Alquist-Priolo Special Studies Zones Act. The zones established were based on several references (listed on figures 2A and 2B). Much of the zoning within the Palmdale quadrangle is based on the work of L.F. Noble (1953), who portrayed the San Andreas fault as a 3-mile-wide zone of Holocene and Pleistocene faults. Recent detailed mapping by Barrows, et al. (1976) indicates that the recently active faults are restricted to a narrower ^{fault} zone than shown by Noble and that the existing Special Studies Zone is unnecessarily wide.

The faults of Barrows, et al. are shown on figures 3A to 3D. These faults are classified (in orange) to identify the Holocene and closely associated Pleistocene faults based on the most recent unit faulted or on the estimated recency of fault-produced topography. This classification is based largely on the mapping of Barrows, et al., but some is based on Kahle, et al (1975) and on personal communications with J.E. Kahle, A.G. Barrows, D.J. Beeby, and D.P. Smith on January 23, 1978. (For comparison with the earlier mapping, the principal Quaternary faults shown on figures 3A-3D are ^{approximately} plotted on figures 2A and 2B.) In addition, certain faults were identified as being inactive during Holocene time based on the lack of evidence for surface faulting in Pleistocene or early Holocene deposits. These localities are identified in green on Plates 3A-3D. A zone boundary (purple dashed line) was then drawn around those faults considered to have been active during Holocene time,

excluding a few minor faults of questionable Holocene activity. The result is a much narrower zone for the San Andreas fault and for its associated faults in the Palmdale quadrangle.

The existing Special Studies Zone in the Ritter Ridge quadrangle (figure 2A) adequately encloses the San Andreas fault and several of its branches ^{as portrayed in recent reports.} However, several minor Holocene faults of Barrows, et al. lie outside of the existing zone on that quadrangle (figure 3A and 3B and figure 2A). Of the two faults north of the San Andreas in section 28-6N-12W, one is very minor and recency of activity on the longer one is questioned by D.P. Smith (p.c. 2/18/78). South of the San Andreas, the fault that crosses Avenue S is defined by a discontinuous scarp, a vegetation alignment, and a closed depression (Kahle, et al., 1974) and may be of Holocene age. Other minor Holocene (?) faults appear to lie outside the existing SSZ in section 30-6N-12-W.

6. Interpretation of aerial photos:

The reports of Barrows, et al. and Kahle, et al. made extensive use of aerial photos in interpreting the location and recency of faulting. My cursory examination of several pairs of photos indicates that the San Andreas fault is well-located and a very obvious first-order feature. The associated faults were less well-defined and some of the faults shown by Barrows, et al. appear to be questionable as to location, continuity, or recency. However, the unnamed faults that lie outside the existing SSZ in the Ritter Ridge quadrangle (discussed above) were not specifically interpreted by me.

7. Field observations:

No field observations were made as part of this reevaluation. However, two earlier visits to this area left me with a strong impression that the recent traces of the San Andreas fault were very obvious compared to the secondary faults located at a distance from that master fault. In fact, some of the secondary faults, mapped by others are difficult to verify in the field.

8. Conclusions:

Based on the recent fault studies of Barrows, et al. and Kahle, et al., the Special Studies Zones established in 1974 for the Palmdale quadrangle are significantly wider than they would have been had they been based on the latest studies. Some minor differences also exist for the Ritter Ridge quadrangle, although no significant Holocene fault lies outside the existing SSZ.

9. Recommendations;

It is recommended that the zone for the Palmdale quadrangle should be revised to a more efficient delineation based largely on the work of Barrows, et al. The approximate recommended zone boundaries are shown (purple dashed line) on figures 2B to 2D. It is not recommended that the zone in the Ritter Ridge quadrangle be revised ^{at this time} solely on the work of Barrows, et al. However, if other zone boundaries are revised ^{at a later date} within this quadrangle, then the minor unnamed faults should be considered for zoning as shown on figures 1A and 1B. Other faults in the western part of the map (figure 2A) should also be re-evaluated based on the recent work of CDMG (see FER-5) ^{at that} ~~in~~ time.

10. Investigating geologist and date:

E.W. HART 2/10/78
Senior Geologist

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